WHAT IS CLAIMED IS:

1. A micro-implantable apparatus and method for the stability assessment of a two-stage dental implant, for assessing changes in stability after dental implants based on vibration theories, comprising: a detection device that detects a transmission of a pulse wave signal from an upper opening of an implant, and then analyzes reflection waves that measure changes in mechanical interlock at a bone-implant interface resulted from wound healing processes at the bone-implant interface; wherein the detection device includes: at least one RF coil serving as a mean to transmit and to receive the detection waves, and allowing the device to be operated in a wireless setting; an energy storage serving as a temporary power supply unit to effectively eliminate signal wires and power cores; and an acoustic wave actuator for generating mechanical detection waves and for receiving the reflected waves, in which the acoustic wave actuator is powered by RF energy.

2. The apparatus and method of Claim 1, wherein one or more RF coils serve to transmit and receive driving energy, to transmit and receive control signals, to transmit and receive detection signals; and to store the received driving energy.

3. The apparatus and method of Claim 1, wherein the RF coils powers the acoustic wave actuator is powered by RF energy by at lease two planar RF coils, in which one coil is connected to an external signal source for transmitting the RF energy, and the other coil is connected to the energy storage located on a substrate for receiving the RF energy.

4. The apparatus and method of Claim 1, wherein the RF energy is converted into DC energy and stored in the energy storage, in which the DC power powers a signal analyzer and an RFIC.

5. The apparatus and method of Claim 3, wherein the acoustic wave actuator is provided on at any location of a top of bottom of the substrate and serves to generate mechanical detection waves.

6. The apparatus and method of Claim 3, wherein the system powers the acoustic wave actuator by an RF signal, in which frequency of the RF signal is dependent on the acoustic wave actuator; and wherein the substrate includes an impedance meter to measure changes in the coil impedance for observing change in the dental implant stability.

7. The apparatus and method of Claim 3, wherein the detection components on both sides of the substrate are connected by a vertical connection.

8. The apparatus and method of Claim 3, wherein the substrate is applied at both sides thereof with a bi-compatible coating.

9. The apparatus and method of Claim 8, wherein the substrate is applied at the side having the RF coils with, but not limited to, a silicon oxide coating.

10. The apparatus and method of Claim 8, wherein the substrate is applied at the side having the acoustic wave actuator with, but not limited to, a titanium metal coating.

11. The apparatus and method of Claim 1, wherein the acoustic wave actuator and the dental implant are provided therebetween with an electroforming for transmitting incident and reflected mechanical detection waves.